

Note: Figures are not drawn to scale. All answers should be bubbles in on the scantron.

1.  $\triangle EHS$  has vertices at  $E(-4, 2)$ ,  $H(10, -9)$ , and  $S(15, 8)$ . A translation maps point  $E$  to  $E'(12, -12)$ .

Find the coordinates of  $H'$  under this translation.

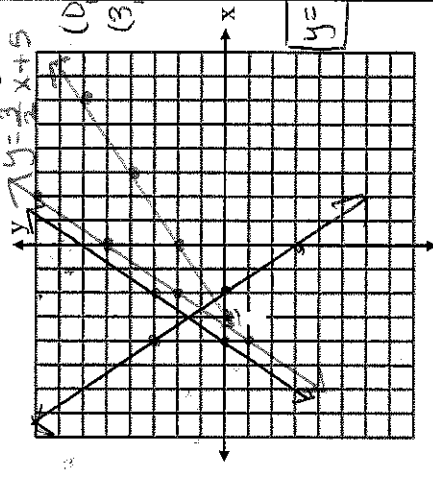
$(x, y) \rightarrow (x+16, y-14)$

$H'(26, -23)$

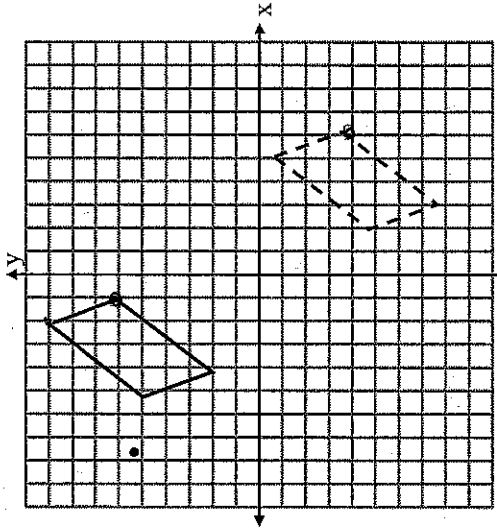
2. The line  $y = \frac{3}{2}x + 5$ , is moved 4 unit to the left and five units down. What is the equation of the new line?

$y = \frac{3}{2}x + 6$

3. Given the line  $y = \frac{2}{3}x + 2$ , write the equation of the image line after a rotation of  $90^\circ$  about the origin.

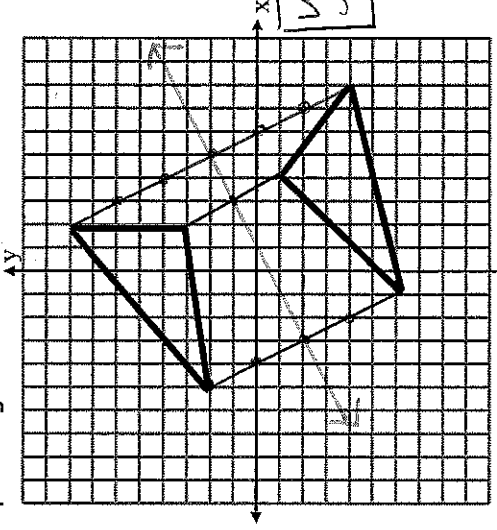


4. The dashed figure is the image of the solid figure. Write a rule to describe the translation.



$(x, y) \rightarrow (x+7, y-10)$

5. Write the equation for the line of reflection you can use to map one figure onto the other.



6.  $\triangle EHS$  has vertices at  $E(-4, 2)$ ,  $H(10, -9)$ , and  $S(15, 8)$ . A translation maps point  $E$  to  $E'(12, -12)$ . Find the coordinates of  $S'$  under this translation.

$H'(-31, -6)$

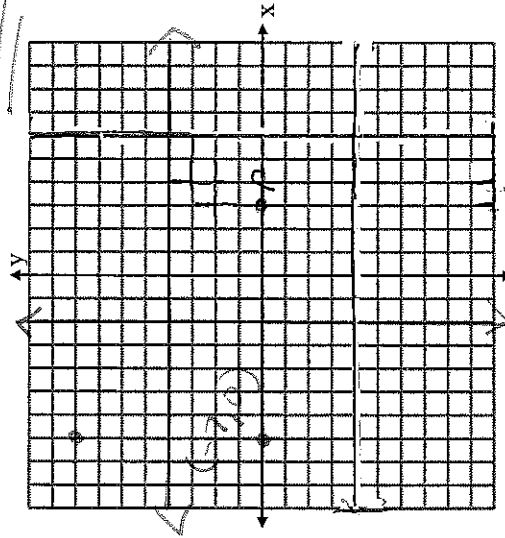
7. Rotate the point  $(7, -9)$ ,  $90^\circ$ ,  $180^\circ$ , and  $270^\circ$  about the origin.

$(9, -7)$ ;  $(-7, 9)$ ;  $(-9, -7)$

8. Find the image of  $P(3, 0)$  after two reflections first across  $l_1$  and then across  $l_2$ .

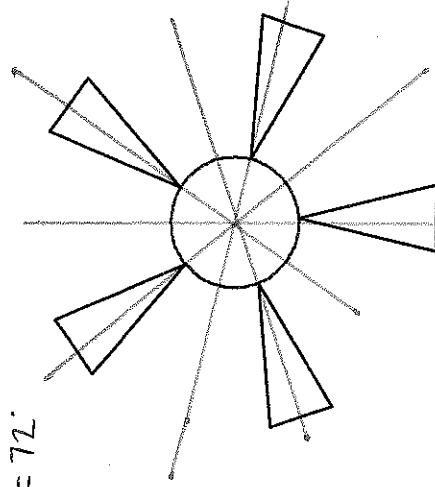
$l_1: x = -2$     $l_2: y = c$

$(-7, 20)$



9. How many lines of symmetry does the figure below have? If it also has rotational symmetry, give the number of degrees of the rotation.

$\frac{360}{5} = 72^\circ$

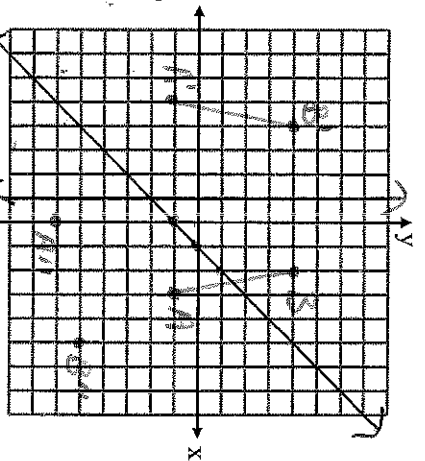


# of Lines: 5

Angle: 72

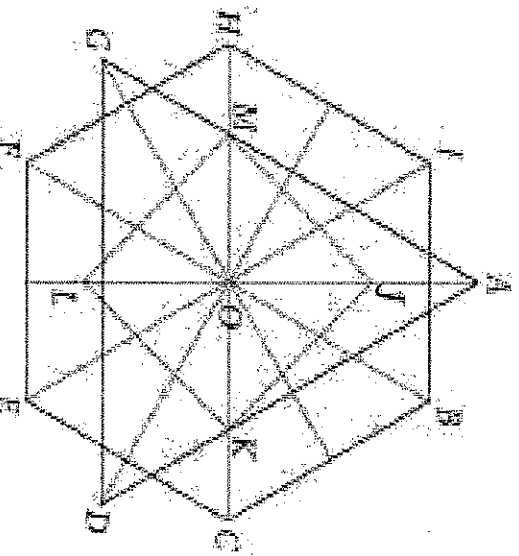
10. The endpoints of  $\overline{AB}$  are  $A(3, -1)$  and  $B(2, 4)$ . Reflect the segment first over the line  $x = -1$  and then over the line  $y = x - 1$ . Graph  $\overline{AB}$ ,  $A'B'$ , and  $A''B''$ .

$A'(-5, -1)$   
 $B'(-4, 4)$   
 $A''(D, -6)$   
 $B''(5, -5)$

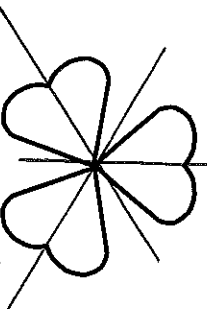


The large triangle, quadrilateral, and hexagon are regular. Find the image of each point or segment for the given rotation. Green segments form  $30^\circ$  angles.

- 120° rotation of B about O H
- 60° rotation of E about O C
- 240° rotation of G about O A
- 120° rotation of F about H I
- 270° rotation of L about O M
- 300° rotation of  $\overline{IB}$  about O BC
- 180° rotation of  $\overline{JK}$  about O ML
- 270° rotation of M about L K



11. Tell what type(s) of symmetry this figure has. If it has line symmetry, sketch the lines of symmetry. If it has rotational symmetry, state the angle of rotation.

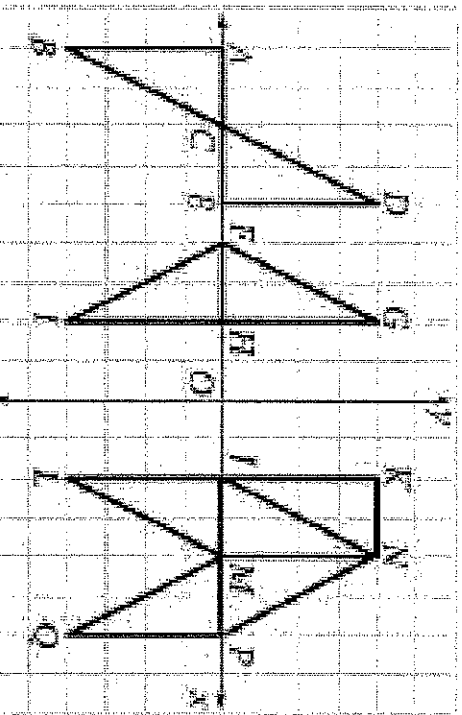


Type(s) of Symmetry: rotational, reflectal

Angle: 120

13. Identify each mapping as a reflection, translation, rotation, or glide reflection. Find the reflection line, translation rule, center and angle of rotation, or glide translation and reflection line.

- $\triangle ABC \rightarrow \triangle EDC$  Rotation, center C, 180°
- $\triangle EDC \rightarrow \triangle PQM$  Glide Reflection, (x,y) → x+1, y)
- $\triangle MNJ \rightarrow \triangle EDC$  Translation, (x,y) → (x-9, y)
- $\triangle HIF \rightarrow \triangle HGF$  Reflection, y=0
- $\triangle PQM \rightarrow \triangle JLM$  Reflection, x=4
- $\triangle MNP \rightarrow \triangle EDC$  Reflection, x = -1/2
- $\triangle JLM \rightarrow \triangle MNJ$  Rotation, center (3,0), 180°
- $\triangle PQM \rightarrow \triangle KJN$  Glide Reflection, (x,y) → (x,y+4); x=4



12. Locate  $M'$ , the image of point  $M$ , after a  $65^\circ$  rotation about  $T$ .

